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AUTHOR Schuelke, L. David; And Others
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ABSTRACT

The objectives of this report are to briefly synthesize the communication approaches used by legislative bodies in the acquisition of scientific information, to describe the practices of the Congressional Research Service of the Library of Congress and the Office of Technology Assessment, to describe the present and proposed communication systems used by Minnesota and other state legislatures, to review the system of a typical urban decision-making body (the Twin Cities Metropolitan Council, Minnesota), and to make recommendations for research to improve communication in political decision making. (Author/KS)

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SCIENTIFIC COMMUNICATION IN THE URBAN ENVIRONMENT: IMPLICATIONS FOR POLITICAL DECISION MAKING

by
L. David Schuelke
Center for Research in Scientific Communication
University of Minnesota, St. Paul
Mark Gonzalez, Research Assistant
William Koentopp, Research Assistant

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The urban centers of our country exhibit both the finest and the basest levels of society. We see in such megalopolises as Chicago, New York, Los Angeles, and Washington D. C. the highest attainments of science and technology alongside the squalor of discarded hardware, and the victims of technology misplaced and misused in the name of development.

Now more than ever before in history, the public as well as special and vested interests are examining and re-examining the products of science and technology toward assessment, control, and the establishment of priorities for sustaining life support systems and ecological balance so vital on this "spaceship" earth.

Between Rachel Carson and Ralph Nader, a new force called, for lack of another term, "public interest in science" has emerged as a viable concern for the process of development, uses, applications, and advancement of science and technology. (Shen, Rickson)

The implication of increased public interest and awareness of science is that national and international organizations must assume roles in the assessment of science and technology. Not the least of these organizations are governmental agencies, political groups, and legislative bodies on both the federal and state levels.

It has been estimated that more than half of the legislative bills

in the U. S. Congress now have a scientific or technological basis. (Shen) This is not surprising in view of the many science-related public issues that confront the citizen today: health, energy, food and agriculture, natural resources, the environment, product safety, space, urban transportation, etc.

What about lawmakers as decision-makers concerning science and technology? How are decisions reached in federal, state, and municipal legislative councils? Our objectives in this report are to: (1) briefly synthesize the communication approaches used by legislative bodies in the acquisition of scientific information; (2) describe the practices of the Congressional Research Service of the Library of Congress and the Office of Technology Assessment; (3) describe the present and proposed communication systems used by the Minnesota and other State Legislatures; (4) describe the system of a typical urban decision-making body, the Twin Cities Metropolitan Council; and (5) make recommendations for research for improvement of communication in political decision-making.

Overview

Legislators have traditionally relied mainly on the long-established structure of committees and committee hearings to get information on a variety of highly specialized or highly technical subjects relevant to pending legislation. (Hattery and Hofheimer, Buchanon) These committees are frequently made up, in part, of members of the legislative body who themselves possess a measure of expertise in the area or issue under consideration. Further, these committees have come to be organized as mechanisms for developing new "specialists" within the legislature. (Anderson, Buchanon)

But there are few of these internal specialists. Legislators have typically relied on them as sources for supplementing information gleaned

from committees.

The committees themselves depend on external specialists for obtaining information relating to decisions involving issues with substantial scientific or technological content. The government publication Technical Information for Congress reveals the variety of types of expert scientific and technical testimony sought by committees. Among various committee sources are:

- Directors and chairmen of scientific agencies and commissions.
- Scientists, technologists and engineers involved in the issue at hand.
- Scientists, engineers, technologists and consultants who specialize in areas of the issue at hand but are not directly involved in it.
- Academicians.
- Military spokesmen and researchers.
- Presidents of major science foundations and academies.
- Leading science personalities.
- State and federal agencies.
- The President's Science Adviser.
- Secretaries of State and Defense.

The formation by committees of advisory panels comprised of external experts (scientists, technologists and engineers) is a common practice.

There is clearly no fixed source or sources of technical advice for these committees. The type of scientists and technologists whose testimony they seek depends on the issue under study. In other words, the committees exploit issue-related external specialists.

The federal legislature can also use the services of the Congressional

Office of Technology Assessment (OTA), an entity which extends the Congressional information-gathering function. OTA helps Congress identify and consider "existing and probable" impacts of technology application (See pages 8-9).

Disagreement among scientists testifying before committees is a major problem which has yet to be effectively resolved. Bitterman's "technical consortium" approach and Stern's recommendation for possibly expanding OTA to act as an "objective" interpreter of information of a technical nature presented to Congress are both possibilities which merit study.

In a recent article in the Bulletin of the Atomic Scientists, Robert A. Smith says it is likely that "Congress will employ or consult with more and more scientists to gain insights on technological issues that would otherwise escape lay office-holders of the House and Senate." Smith believes the increasing involvement of scientists in politics will give rise to "scientist statesmen" to whom the public will turn for national leadership "with the same sort of devotion bestowed upon soldiers in the past."

To summarize:

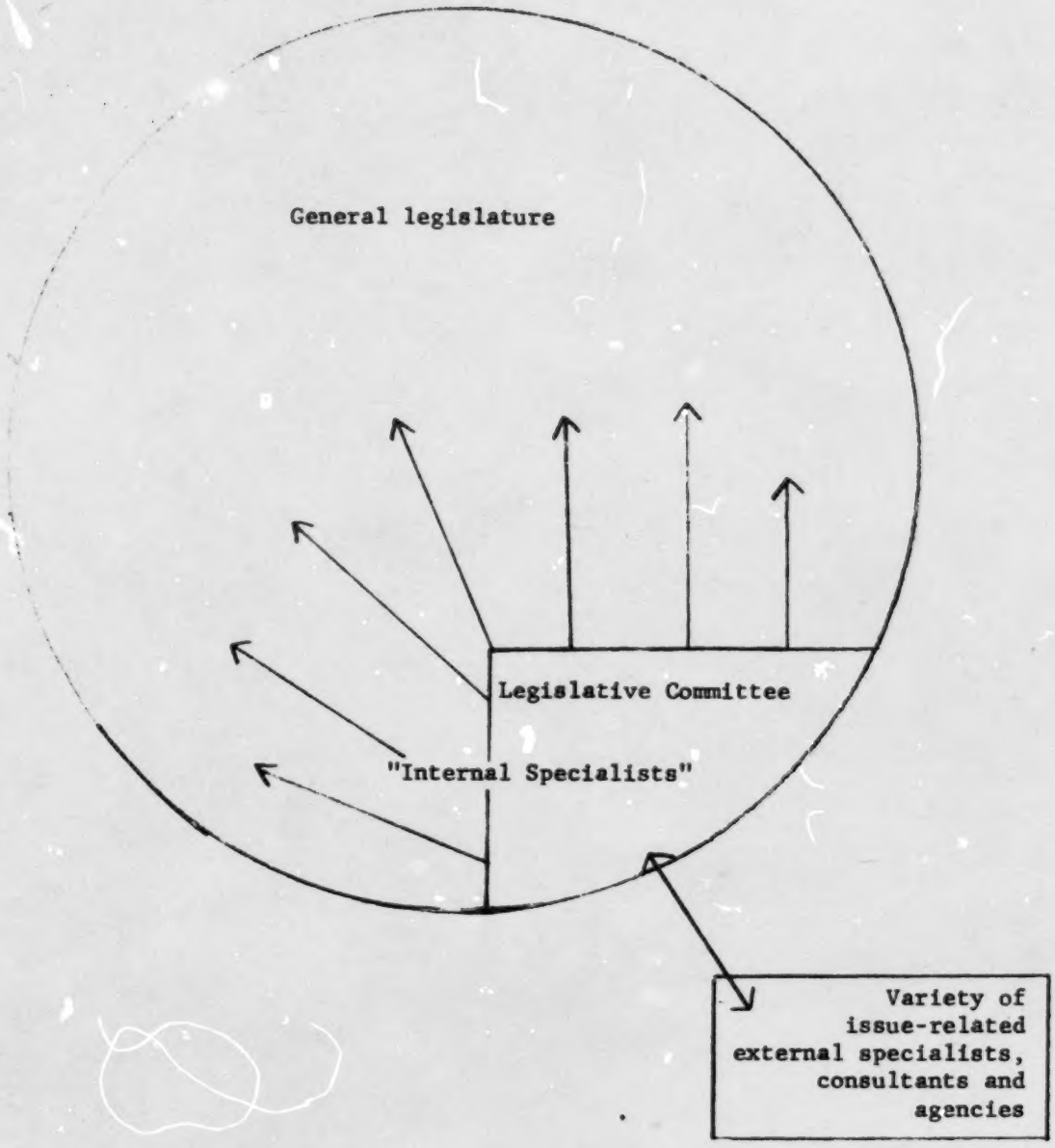
The legislative committee seems to be the fundamental source of specialized information for state and federal legislators.

The committees arrange for and hear testimony from a wide range of issue-related external scientific and technical experts.

The committees relay this information to the general legislature primarily by means of committee hearings.

"Specialists" exist and are developed (by committees) in the legislatures.

They serve alongside the committees as major sources of technical advice.



An overview of legislative procurement and dispersion of technical information

Federal Services

Established in 1914, the Legislative Reference Service of the Library of Congress grew slowly. Through the 1930s and 1940s its staff of 95 provided general reference information relating to national issues and compiled, edited and published statutory indexes. Senior specialists were appointed under the Reorganization Act of 1946 to augment the LRS; their primary duty was to "analyze, appraise and evaluate legislative proposals pending before Congress."

Given a new charter and a new name by the Joint Committee on the Organization of Congress (See footnote 1) as a result of the Legislative Reorganization Act of 1970 (Public Law # 91-510, sec 321), the LRS is now called the Congressional Research Service (CRS) and is organized into the Office of the Director, eight research divisions and two information, reference and support divisions (See footnote 2).

The CRS (by Congressional request) supplies any individual legislator or committee with "experts capable of preparing objective, non-partisan, in-depth analyses and appraisals of any legislative subject matter to evaluate alternative legislative proposals and identify probable results." (See footnote 3)

A CRS staff is selected (by the Office of the Director) to provide unbiased, accurate and documented compilation of facts tailored to a particular legislative format, and to schedule and augment the knowledge of any particular subject a legislator, a committee or their staffs might have.

A researcher's report is evaluated by CRS colleagues and supervisors through internal review and quality-control processes to identify and eliminate individual bias.

Since the status of legislative deliberation could affect information collection, confidentiality is vital. Protection of the ideas and plans of legislators and committees is a constraint which is not widely recognized by the public.

Congress establishes CRS objectives and determines priority as well as limits of scope and time. CRS assignments fall into four general categories: (1) statutory analyses for Congress as a whole; (2) committee requests for background studies and continuing consultation through hearings; (3) legislator requests for more specific information of smaller scope than committee requests; and (4) constituent inquiry via legislators.

Because of the topical nature and swift development of public policy issues, sources of information outside the CRS are vital for obtaining current as well as comprehensive data. As a result, CRS staffs often provide the Congress with a channel between the political process and various fields of knowledge.

Aside from the hearing process, Congress also obtains information, knowledge and technical and analytical support from a wide variety of internal sources. Those under its direct control include the staffs of its legislators; committee staffs; the Offices of the Legislative Counsels and of the two Parliamentarians; and the House and Senate libraries. Two other unique arms of Congress, the CRS (backed by the Library of Congress) and the General Accounting Office, provide different kinds of specialized resources. In addition, Congress frequently obtains assistance from executive branch agencies and numerous privately-supported interest groups. It also might receive aid from universities, private consultants (usually via the CRS) and, in the case of individual legislators, from constituents.

Many of the problems and issues which compete for congressional attention reflect the growing impact of science and technology on public affairs. Some of these problems can be solved only through the proper application of scientific inquiry. The Congressional Office of Technology Assessment (OTA) was formed in 1972 as "an aid to Congress in the identification and consideration of existing and probable impacts of technology application." (Bill No. H.R. 10243) Its main responsibilities are to "provide an early appraisal of the probable impacts, positive and negative, of the application of technology, and to develop other coordinate information which may assist Congress in determining the relative priorities of programs before it." (H.R. 10243) The bill establishing OTA points out that these "are informational functions, not functions of control or recommendation."

The Office is composed of a policymaking body called the Technology Assessment Board and an operational unit called the Technology Assessment Advisory Council.

The Board, whose first members were appointed in February of 1973, consists of six Senators (three from each party), six Representatives (again three from each party) and a Director, who is a non-voting member.

The Council, whose members have also been appointed, consists of ten public members, the Comptroller-General and the Director of the Library of Congress.

Emilio Daddario, who introduced the first bill to establish the OTA in 1966 while a Representative from Connecticut, was appointed Director of the Office. (Coates)

The assessment activities of OTA may be initiated "upon the request

of" the chairman of any Congressional committee or the ranking minority member, or for a majority of the members of a committee; or may be initiated by the Technology Assessment Board or by the Director in consultation with the Board. (Coates)

Unfortunately, "most committee chairmen have little or no understanding of what technology assessment is, or what the Office could do." (Coates)

Coates points out a number of other problems facing OTA:

(1) Daddario apparently conceived OTA "as being an entity which would serve the Congress by supplying it with hard, reliable information, but which would be more or less independent of the internal policies of Congress."

As it turns out, however, the new Office much more closely resembles a joint committee. It "faces difficulties of accomplishing its work without appearing to violate the territory and jurisdiction staked out by other committees, of which it must at the same time attempt to serve the needs." (Coates)

(2) The Chairman of the Technology Assessment Board could use his position "to exploit the issues with which the Office struggles to gain political noteriety." (Coates)

Robert J. Stern, in a recent article in the Bulletin of the Atomic Scientists, recommends consideration of the possibility of expanding OTA to allow it to act as an "objective" interpreter of all information of a technical nature presented to Congress, as a means of resolving disagreements among scientists whose Congressional testimony is sought.

State of Minnesota--Office of Legislative Research

Formal requests from the Minnesota State Legislature (MSL) are channeled to the Office of Legislative Research (OLR). This office was constitutionally founded and funded in 1973 by the MSL. Although it is divided to separately serve both the State House and Senate, the OLR is directly responsible and subordinate to the Joint Coordinating Committee, a bipartisan body of legislators, alternately presided over by the Senate and the House.

The OLR consists of nine Senate and 15 House researchers who assist legislative committees and caucus staffs. Separately identified as Senate Research and House Research, they work in coordination with the Legislative Library staff and the eight attorneys of the Adviser's Office which converts the wording of tentative bills into legal terms.

Fifteen House researchers (composed of five attorneys and ten individuals with either Masters or Ph.D. degrees in subjects from Public Administration to Psychology) serve 17 standing committees on an ad hoc basis.

The nine Senate researchers (newspapermen by previous career or B.S. to Ph.D. college graduates in a variety of subjects) work with the Senate at large on a topical basis.

The OLR is funded through the Rules and Advisory Committee from General Appropriation funds of the Minnesota Legislature.

The OLR acts as a research service by collecting and analyzing information in response to legislator or committee request. It complements caucus and transient committee staffs. By constitutional direction, the independent, non-partisan experts of the OLR are to provide processed

information without conclusions, implied or otherwise, to the Minnesota Legislature.

If the request for information exceeds its capabilities, the OLR contracts services of professional consulting firms. Acting as an intermediate, the OLR functions as a linker to supply objective reports and summaries to the MSL. Limited by its relatively small staff, the OLR is not as responsive as it might be during peak periods of bill initiation and passage. No other device, however, is constitutionally recognized to transform, interpret or simplify raw information.

The OLR is expected to expand with an increase in funding in 1976. The Legislative Improvement Committee has obtained a Ford Foundation grant to make the OLR more responsive to citizen need.

If an author or opponent of a controversial bill needs expert technical or scientific advice, the OLR finds experts who can provide pertinent testimony. (One legislator said that the amount of effort expended to obtain external technical or scientific advice relevant to the content of any bill tends to be directly proportional to the amount of controversy over its passage.) Usually assembled to provide a "pro" and "con" rebuttal in committee or on the floor, technical experts (other than those of the interest group sponsoring the bill) are usually culled from personal contacts of the legislator or researcher from other state departments, from the University of Minnesota or from business and industrial representatives.

Gordon Voss, a Minnesota State Representative, sees legislative opinion and decisions as dependent upon three factors: (1) substantive information; (2) distrust of experts and (3) legislator peer-group pressure. Voss says the first of these factors--substantive information--"always" loses when in conflict with either of the other factors.

Voss is the author of a proposal for the formation of a Minnesota Office of Science and Technology (OST). The Office would be patterned after the Information Services Committee, a model program which serves as a clearinghouse for technical information passed between state legislatures, or from the federal government (or any other source) to state legislatures.

OST would be responsible to the Joint Coordinating Committee of the Minnesota State Legislature, and would function as a service for transferring technical information to the MSL.

A two-man staff, funded by $41,000 from the National Science Foundation and by an equal amount of state money, would act as liaison between federal research projects, academia and the MSL.

The two staff members would be "generalists" from areas of the physical and biological sciences. They would act as linkers between information sources and legislative users of scientific and technical data.

The staff would pass information, make long-term assessments, and work to correct the lack of communication between academic and political figures which impedes resolution of state political problems.

Distrust of experts and fear of staff domination seem to be the primary obstacles stalemating approval of the Office of Science and Technology by the MSL.

As few as six other states have organizations which are similar to the proposed OST: New York, Illinois and California are among them.

<u>New York</u>

New York was the first state to establish a full-time legislative science and technology advisory mechasism (Wisconsin Informational Bulletin

74-IB-9). Functioning through chairmen of standing committees, the relatively small (six-member) Assembly staff reacts to day-to-day requests and anticipates problems of long-term interest. The staff provides information from its own experts, as well as from dialogue with experts in universities, professional societies, industry and government. Synthesizing technical information; recognizing which, if any, technological considerations apply; and summarizing such information in readable terms are key problems facing the Assembly staff.

Illinois

The Illinois Legislative Council Committee on Science and Technology employs one full-time Ph.D. scientist and one science and technology intern. They respond to state legislators' "spot" research requests either with science information from their own sources or by contracting with various universities for reports on selected topics.

California

The Assembly Science and Technology Advisory Council (ASTAC), created by the California Assembly in 1969, is modeled on the President's Science and Advisory Committee. Its 15 to 20 members, "drawn from the ranks of California universities, private research organizations, industry and professional associations" (Wisconsin Informational Bulletin 74-IB-9), serve as an objective, nonpartisan advisory group which is attached to the Assembly through the General Research Committee. ASTAC creates technical panels, which vary in composition, to undertake specific projects. Despite criticisms that ASTAC staff have not interacted sufficiently with Assembly committees and committee staffs, a recent assessment of the Council's performance "concluded that its operation has led to improved legislative decision-making" (Wisconsin Informational Bulletin 74-IB-9).

The Twin Cities Metropolitan Council (St. Paul and Minneapolis)

The Metropolitan Council was formed in 1967 by the Minnesota State Legislature. It evolved as the result of a long historical trend toward regional cooperation. Issues such as the location of streets and highways, planning for parks and open space and disposal of solid waste were seen to require a regional perspective in the decision-making process.

The Metropolitan Council has 16 members who serve on a part-time basis and are citizens appointed by the Governor from a combination of state legislative districts in the seven-county Twin Cities area. The Council chairman, the 17th member, is also appointed by the Governor from the area at large. The chairmanship is a full-time position.

The Council operates through a committee structure. Three standing committees develop and examine proposals and then make recommendations for consideration by the full council. These three are the Human Resources, Physical Development and Personnel and Work Program Committees. The latter committee reviews and recommends internal management matters and legislative proposals.

The 17 councilmen of the MC, in turn, appoint members of seven advisory boards and committees. These committees provide for participation by citizens, professionals, public officials and others in important regional issues. They are the primary mode of public participation in Council decision-making.

The Council is supported by 130 full-time staff who do research, serve advisory committees and provide organizational continuity between committee meetings.

The actual implementation of MSL-directed Council responsibilities is left to three commissions: the Metropolitan Waste, Transit and Park and Open Space Commissions.

The Council is responsible for preparing a comprehensive guide for the metro area by conducting research, gathering data, and making recommendations. It reports to the state legislature with specific suggestions for legislation. Serving as the focal point for the identification and examination of problems facing people in the region, the Council does research in air pollution, parks and open space, water pollution, long-range planning, solid-waste disposal, tax structure, assessment practices, storm water drainage, consolidation of services of local governments and advanced land acquisition for development of the metropolitan area. These studies are to include recommendations for the governmental organization and structure best suited to perform these functions.

Planning, coordinating and recommending a plan with citizen advisory committees involves problem exploration and analysis through expert, official and citizen testimony, and through staff research and analysis. Task forces of citizens and MC staff are formed to insure citizen input.

Advisory boards of citizens from 131 municipalities, 65 townships, seven counties, ten watershed districts, metropolitan and state agencies and other organizations provide for an Urban Developmental Framework. The boards study proposals to assist planning by local government before laws are enacted; give comment and evaluation to federal, local and state governments; and incorporate federal grants into local governmental plans.

All local government is subordinate to the three MC Commissions in areas of waste disposal, transit and park/open space matters. The MC constrains local government planning by denial of federal funds, if necessary, to compel compatible planning and development.

The MC initiates studies both independently, and in response to specific legislative requests. The Council can: make recommendations to local government in the form of positive or negative comment on local planning; advance concrete proposals to the legislature; or move to modify the Council itself.

The internal coordinator of the MC stated that only rarely are any outside consultants used to supplement MC staff or citizen advisory committees in researching and analyzing problems.

Legislative implementation of any MC study is tacit approval of proposals.

Conclusion

The Center for Research in Scientific Communication at the University of Minnesota, St. Paul, was established in 1974 to conduct research in the phenomena of scientific communication and the use of technical communication.

Using the background provided in this report of examples of information processing in selected political arenas, we may list the following communication variables that require research to improve the communication of scientific information for political decision-making:

(1) the increased need for public awareness of scientific issues via the mass media;

(2) the need for study and development of special communication formats--such as the environmental impact statement and the technology assessment--as

vehicles for information analysis and presentation;

(3) the role of interpersonal trust, source credibility, and small-group processes as they apply in the identification of sources of scientific information and the utilization of these sources by political decision-makers;

(4) the degree to which both the flow of information and communication channel selection and overload play a part in the acquisition of scientific and technical information;

(5) the practice of linkers and "gatekeeper" agencies in either constitutionally-established or quasi-official departments in the acquisition, processing, and dissemination of scientific and technical information;

(6) the role of scientific organizations--such as the American Association for the Advancement of Science, the National Academy of Sciences and the National Science Foundation--in directing and conducting research in the phenomena of scientific and technical information and political decision-making;

(7) the development of urban and regional information systems with capacity for statistical and geographical data bases that could be probed for instantaneous answers to technological development queries;

(8) the experimental development of new technologies and information instruments to provide for greater validity and reliability of scientific information as it is required by decision-makers;

(9) the posture and policy of legislative bodies in providing for rigorous and unbiased sources of scientific and technical expertise that are capable of overriding the present partisan committee structure of legislative inquiry into scientific matters.

With these areas for investigation open to communication scholars and researchers, the opportunities for study seem unlimited. At Minnesota we have started our program in an effort to provide badly-needed solutions to a variety of problems in this important area of applied communication research.

FOOTNOTES

1. The Joint Committee on the Library and Congressional Research guides CRS policy and assists CRS in securing required resources. The Committee makes yearly reports to the Congress.

The Committee is composed of 12 members, equally divided between the two major parties. Six members are appointed by the Speaker of the House, and six by the Senate Pro Tempore. The Committee chooses its own chairman and vice president--who must be of different parties--and assigns them professional and clerical staff.

2. The Office of the Director establishes policy, deals with administrative and housekeeping functions assigned by the Library of Congress, and maintains contact between the Joint Committee on the Library and various subordinate committees.

The eight research and two information and support divisions are the: American Law; Economics; Education and Public Welfare; Environmental Policy; Foreign Affairs; Government and General Research; Science Policy Research; Senior Specialists; Congressional Reference; and Library Services divisions.

3. U. S. Congress, Annual Report of the Congressional Research Service of the Library of Congress to the Joint Committee on the Library, April 27, 1972, p. 88.

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